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IS 14929 (2001): Textiles - High Strength Polyolefins Copolymer Ropes [TXD 9: Cordage]

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वस्त्रादि — उच्च सामर्थ्य पॉलीओलीफाइन्स कोपॉलीमर की रस्सियाँ — विशिष्टि

Indian Standard

TEXTILES — HIGH STRENGTH POLYOLEFINS COPOLYMER ROPES — SPECIFICATION

ICS 59.060.20; 59.080.50

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

April 2001 **Price Group 2**

Cordage Sectional Committee, TX 09

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Cordage Sectional Committee had been approved by Textile Division Council.

This standard has been formulated to take care of the limitations of the presently available polypropylene and polyethylene mooring ropes and hawsers used at single point mooring terminals and the marine and offshore industries in general. The rope made of polyolefins copolymer covered in this standard is having 20 to 30 percent higher strength.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounding off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 SEPTEMBER 2003
TO
IS 14929 : 2001 TEXTILES — HIGH STRENGTH POLYOLEFINS COPOLYMER ROPES — SPECIFICATION

(*Page* 1, *clause* **6.1**) — Insret the following sentence at the end:

'Realization factor for determining the breaking strength of the rope of nominal diameter as 40 mm or more shall be as given in Annex A.'

(*Page* 4, *Table* 2) — Insert the following Annex A after Table 2:

ANNEX A
(*Clause* 6.1)

REALIZATION FACTOR FOR HIGH STRENGTH POLYOLEFINS COPOLYMER ROPESES

Nominal Diameter of Reference Number mm	Realization Factor
40	0.890
44	0.890
48	0.890
52	0.880
56	0.875
60	0.870
64	0.865
68	0.860
72	0.855
76	0.850
80	0.845
88	0.840
96	0.835

(TX 09)

Reprography Unit, BIS, New Delhi, India

Indian Standard

TEXTILES — HIGH STRENGTH POLYOLEFINS COPOLYMER ROPES — SPECIFICATION

1 SCOPE

This standard specifies requirements for 3-strand hawser-laid and 8-strand plaited high strength polyolefins copolymer ropes.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
3256 : 1980	Code for inland packaging of ropes and cordages (*first revision*)
3871 : 1996	Textiles — Fibre ropes and cordage — Glossary of terms (*second revision*)
6359 : 1971	Method for conditioning of textiles
7071 (Parts 1 to 3) : 1989	Ropes and cordages — Methods of physical test (*first revision*)
7071 (Part 4) : 1986	Methods of physical test for ropes and cordages — Breaking load and elongation at break

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 3871 shall apply.

4 ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTS

The tests shall be carried out under prevailing atmospheric conditions. In case of dispute, however, the tests shall be carried out on samples which have been conditioned for 24 h in a standard atmosphere at 65 ± 2 percent relative humidity and 27 ± 2°C temperature (*see* IS 6359). If practicable, the tests shall be carried out in the standard atmosphere. Otherwise, tests shall be carried out as quickly as possible but not exceeding 15 min of removal of the test pieces from the conditioning atmosphere.

5 MANUFACTURE

5.1 Yarn

The ropes shall be manufactured from polyolefins copolymer monofilament yarn, fibrillated film or serrated tape. Polyolefins copolymer is a blend of polypropylene and high density polyethylene in certain proportion to achieve the high strength.

5.2 Construction

5.2.1 Unless otherwise specified, howser-laid ropes shall be manufactured from hawser-laid yarns twisted together with a 'Z' twist, the strands themselves consisting of single yarns or 'Z' twisted yarns in 'S' twist.

5.2.2 Unless otherwise specified, 8-strand plaited ropes shall be manufactured from four pairs of strands, each alternate pair consisting of two 'S' twisted and two'Z' twisted strands respectively.

5.2.3 The number of yarns in all the strands shall be equal. However, a variation upto ± 5 percent shall be permissible.

5.3 Structure

The ropes and their strands shall be continuous without splice.

5.4 Rope

The twisted rope shall be flexible, well laid and free from defects in yarn, strand and finish.

6 REQUIREMENTS

6.1 The 3-strand hawser-laid rope shall conform to the requirements given in Table 1 and 8-strand plaited rope shall conform to the requirements given in Table 2.

6.2 Mass of the Coil

The net mass of the coil containing 220 m of rope including ties and lashing but excluding packing materials shall be as specified in Table 1 and Table 2 for 3-strand hawser-laid and 8- strand plaited ropes respectively.

NOTE — In case the coil of rope contains length other than 220 m, net mass shall be calculated by multiplication of linear density with rope length.

6.3 Length of Coil

The length of each coil when tested as per IS 7071 (Parts 1 to 3) shall not be less than 220 m or as declared. However, if so agreed between the buyer and the seller, the length of coil may be tested under zero tension. The following tolerance shall be applicable on the specified/declared length:

Reference Number	*Tolerance*
Up to 14	± 5 percent
Above 14	± 3 percent

7 SAMPLING AND CRITERIA FOR CONFORMITY

7.1 Lot

All coils of rope of the same linear density, dimensions, and type, manufactured under similar conditions and delivered to a buyer against a dispatch note shall constitute a lot.

7.2 Sample Size

Sampling shall be as representative as possible of the lot subjected to measurements and tests. Draw the samples at random, at the rate shown by the following formula:

$$S = 0.4\sqrt{N}$$

where

S is the number of sample lengths of rope, and

N is the size of the lot expressed as the number of coils.

When S as calculated is not a whole number, round off the value obtained to give a whole number in accordance with the requirements of IS 2. In case S is less than 1, draw one sample length.

7.3 Criteria for Conformity

The lot should be declared conforming to the standard if the following conditions are satisfied:

a) Length of each coil satisfies the specified/ declared length;

b) All the individual test samples tested for breaking strength satisfy the specified breaking strength. However, in case of failure of a test specimen drawn from a coil another specimen shall be retested from the same coil and the same shall satisfy the specified requirement; and

c) Average values of the test results of the lot in respect of other characteristics conform to the specified requirements.

8 MARKING

8.1 Each coil shall have securely attached lables at both ends carrying the following information:

a) Name of the material;

b) Reference number (diameter, mm);

c) length (m) of the rope;

d) Indication of the source of manufacture; and

e) Any other information required by the buyer.

8.2 BIS Certification Marking

Each coil may also be marked with the Standard Mark.

8.2.1 The use of Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 1986 and Rules and Regulations made there under. The details of the conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

9 PACKING

The ropes shall be neatly coiled and suitably packed to prevent damage during transit.

NOTE — IS 3256 may be followed for packing ropes intended for use within the country.

Table 1 Requirements of 3-Strand Hawser-Laid High Strength Polyolefins Copolymer Ropes

(*Clauses* 6.1 *and* 6.2)

Nominal Diameter (Reference Number) mm (1)	**Mass per Coil (220 m Length)** kg (2)	**Linear Density** ktex (3)	**Breaking Strength, *Min*** kN (kgf)[1] (4)
4	1.63	7.4	2.992 (305)
6	3.67	17.0	6.620 (675)
8	6.60	30.0	11.915 (1 215)
10	10.00	45.0	18.094 (1 845)
12	14.50	65.0	26.478 (2 700)
14	20.00	90.0	36.187 (3 690)
16	25.50	115.0	42.365 (4 320)
18	32.50	148.0	53.839 (5 490)
20	40.00	180.0	67.078 (6 840)
22	48.50	220.0	82.082 (8 370)
24	57.00	260.0	92.674 (9 450)
28	78.00	355.0	127.978 (13 050)
32	101.00	460.0	163.283 (16 650)
36	129.00	585.0	205.648 (20 970)
40	158.00	720.0	247.132 (25 200)
48	229.00	1 040.0	348.632 (35 550)
56	312.00	1 420.0	458.959 (46 800)
Tolerance			
4 to 8 mm	± 10 percent	± 10 percent	
10 to 14 mm	± 8 percent	± 8 percent	
16 mm and above	± 5 percent	± 5 percent	
Method of Test	← IS 7071 (Parts 1 to 3) →		IS 7071 (Part 4)

[1] 1 kN = 101.97 kgf approximately.

Table 2 Requirements of 8-Strand Plaited High Strength Polyolefins Copolymer Ropes

(*Clauses* 6.1 *and* 6.2)

Nominal Diameter (Reference Number) mm (1)	Mass per Coil (220 m Length) kg (2)	Linear Density ktex (3)	Breaking Strength, *Min* kN (kgf)[1] (4)
24	57	260.90	92.674 (9 450)
26	67	305.0	108.120 (11 025)
28	78	355.0	127.978 (13 050)
30	89	405.0	145.631 (14 850)
32	101	460.0	163.283 (16 650)
34	114	520.0	184.025 (18 765)
36	129	585.0	205.207 (20 925)
38	144	660.0	228.596 (23 310)
40	158	720.0	247.132 (25 200)
42	174	790.0	272.286 (27 765)
44	194	880.0	300.081 (30 600)
46	212	970.0	322.154 (32 850)
48	229	1 040.0	348.632 (35 550)
50	248	1 140.0	370.697 (37 800)
52	268	1 220.0	401.589 (40 950)
54	289	1 315.0	432.921 (44 145)
56	312	1 420.0	458.959 (46 800)
58	335	1 540.0	489.850 (49 950)
60	359	1 630.0	525.154 (53 550)
62	383	1 750.0	560.459 (57 150)
64	407	1 850.0	596.205 (60 795)
66	433	2 000.0	626.655 (63 900)
68	460	2 130.0	668.138 (68 130)
70	487	2 222.0	706.090 (72 000)
72	515	2 340.0	745.808 (76 050)
74	541	2 500.0	781.112 (79 650)
76	574	2 630.0	829.656 (84 600)
78	605	2 780.0	871.138 (88 830)
80	638	2 900.0	917.917 (93 600)
82	670	3 120.0	962.048 (98 100)
84	703	3 220.0	1 006.178 (102 600)
86	737	3 450.0	1 050.309 (107 100)
88	772	3 510.0	1 103.366 (112 500)
90	807	3 700.0	1 147.396 (117 000)
92	846	3 850.0	1 200.353 (122 400)
94	883	4 010.0	1 252.868 (127 755)
96	916	4 170.0	1 306.266 (133 200)
104	1 075	5 000.0	1 531.332 (156 150)
112	1 250	5 550.0	1 774.051 (180 900)
120	1 435	6 660.0	2 030.009 (207 000)
Tolerance	± 5 percent	± 3 percent	
Method of Test	← IS 7071 → (Parts 1 to 3)		IS7071 (Part 4)

[1] 1kN = 101.97 kgf approximately.

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